Jordan Valley Authority

Overview of the Proposed FAS Design

Financial Accounting System Program

July 2000

OSC Member
FAS Team Member

FORWARD

Collaborative Approaches for Resolving Water Issues

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Prepared for the United States Agency for International Development
under Contract No. HNE-C-00-96-90027-00

ACRONYMS

AP	Accounts Payable
AR	Accounts Receivable
COA	Chart of Accounts
FA	Fixed Assets
GL	General Ledger
H/W	Hardware
IC	Inventory Control
JC	Job Costing
KTR	King Talal Reservoir
LAN	Local Area Network
MISSC	Management Information System Steering Committee
PO	Purchase Order
RDBMS	Relation Database Management System
SGWA	Southern Ghors and Wadi Araba
S/W	Software
WAN	Wide Area Network
WIP	Work In Progress
WMIS	Water Management Information System

ARABIC EXECUTIVE SUMMARY

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Location	GL	AP	AR	IC	JC	FA	WIP	No. of Users
JVA Headquarters – Amman	X	X	X	X	X	X	X	15
Central Stores (Rewiha)				X				3
Supplies Directorate		X		X				3
Central Workshop				X	X			3
Southern Ghors and Wadi Araba				X	X			3
Dams						X	X	3
X: Module to be installed/Access to be granted				**Total**				**30**

EXECUTIVE SUMMARY

The report starts by giving a background of the software structure of any modern financial accounting systems. The structure of any given financial accounting system can be categorized into modules. Certain modules can run as standalone. Where other modules have to be programmatically linked with other modules in order to operate. It continues to describe a basic definition for journal, ledger and the different software architectures such as client/server architecture, 2-tier and n-tier architecture and enhancements incorporated within each model.

The suggested design for the financial accounting system was driven by the following factors:

- **Business Practices and Findings.** Those findings were extracted from the process mapping documents and formed a basis of the suggested design scenario. As an example, the centralization of expenditures, the distribution of Water Management Information System in the Jordan Valley and the Southern Ghors and Wadi Araba, The centralization of store's records and the maintenance operation performed by workshops.

- **Interconnection Technical Limitation.** Availability of communication lines such as ISDN in the Jordan valley. The special operating conditions in terms of heat imposes a technical limitation on the normal operating condition of certain electronic or computing devices.

- **Cost/Benefit and FAS Budget**. Any suggested design scenario should be carefully planned and technically equipped but it has also to stay within certain guidelines such as fund adequacy and for cost to be less than or equal to the benefit not to exceed it.

Chapter three of the same reports illustrated the functionality of the General Ledger (GL), Accounts Payable (AP), Accounts Receivables (AR), Fixed Assets (FA), Purchase Order (PO), Inventory Control (IC), Job Costing (JC) and Work In Progress (WIP) modules and the reason why a given institution may choose to implement any.

Finally the report concludes by suggested scenario and its components giving, modules to be used, number of users, dataflow path along with a tentative server distribution schema.

The following table summarizes FAS estimated number of users.

Location	GL	AP	AR	IC	JC	FA	WIP	No. of Users
JVA Headquarters – Amman	X	X	X	X	X	X	X	15
Central Stores (Rewiha)				X				3
Supplies Directorate		X		X				3
Central Workshop				X	X			3
Southern Ghors and Wadi Araba				X	X			3
Dams						X	X	3
X: Module to be installed/Access to be granted				**Total**				**30**

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CHAPTER 1
BACKGROUND

1.1 Introduction

This General Process Mapping document presents JVA's business and related accounting cycles. This guided the FORWARD team and the JVA Oversight Committee in the preliminary system design of the Financial Accounting System (FAS) in terms of modules needed in Amman and the Jordan Valley and identifying the data flow path.

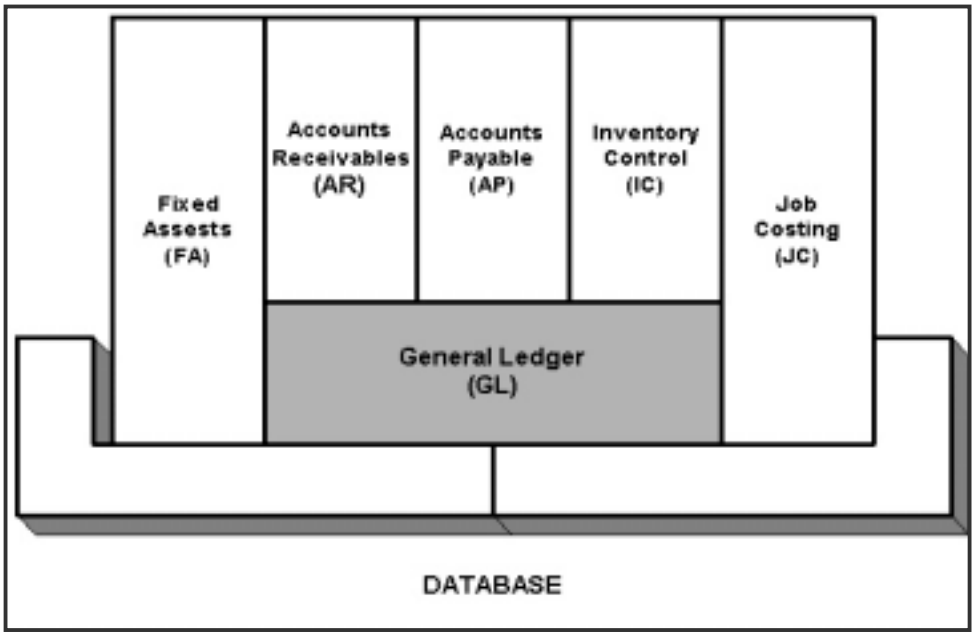
Financial accounting programs process many types of accounting transactions. These include transactions affecting accounts in both the general and special journals. These programs organize transaction processing in modules and provide a software (i.e. programmatic) link among these modules. Generally, all accounting softwares are formed in the shape of modules and built over the main module, which is the General Ledger (GL).

The GL module includes the chart of accounts and contains detailed monetary information about an organization's various assets, liabilities, owners' equity, revenues and expenses. The module is also used to record the general journal transactions.

Accounting software can include other modules that integrate with the GL module. These include: Accounts Receivable (AR), Accounts Payable (AP), Inventory Control (IC) and Fixed Assets (FA). Journal entries are recorded in these modules. These modules update the GL either on a periodic or real-time basis.

Depending on the complexity of the accounting software, it may include additional modules such as Job Costing (JC), Order Entry (OE), Purchase Orders (PO), Payroll and Work in Progress (WIP). Figure 1.1 illustrates a sample accounting software structure.

Figure 1.1
Financial Accounting Software Modules Interdependency Chart



1.2 Journals and Ledgers

Journals and ledgers are the most important elements of any transaction process because they help accountants translate transactions into financial statements. Basically, information is collected from source documents (e.g. supplier invoices, billing, internal documents) and transcribed into a journal entry format. Journal entries are then processed, either manually or by computer, and entered in ledger accounts. The general ledger is used to prepare the financial statements, which are the primary output of any financial accounting system.

A journal may be a general journal or a special journal. Special journals capture a specific type of transaction, which are usually reserved for frequently occurring transactions. For example, most organizations make sales on credit. A company making many credit sales might decide to set up a special sales journal for these transactions. Rather than debiting accounts receivable and crediting sales for each transaction, the accounting clerk, using special journals, records debit to the particular customer's account within the subsidiary ledger for receivables. The transactions in the sales journal are totaled daily. Within the general ledger, one debit is made to the accounts receivable account and one credit is made to the sales account.

1.3 Software Architecture (Model)

Throughout the years computing models have migrated from host-based computing (i.e. centralized), where there is one Mini/Mainframe computer connected to dummy terminals (a monitor and a keyboard with no CPU or memory) to the now common Client/Server architecture.

A Client/Server architecture is broken down into two parts:

- A Server which is used for file sharing and database; and
- A Client (Workstation) which is a PC that connects to the server and holds the application part.

Unlike the old (i.e. host-based) computing model, where processing of transaction(s) and numerical computation were carried on the host side, the Client/Server architecture utilizes the server for data storage, file sharing, data retrieval and sometimes for printer sharing. All computation is now done on the client side, utilizing the client (workstation) hardware and software resources, effectively minimizing data volume and frequency of communication required with the main server.

Nevertheless, the new model required more advanced network structures (data communication media) to handle the amount of traffic generated from the workstation side being sent to the server. New network topologies were introduced to connect inter-premises computing devices (Local Area Network or LAN) with each other and to interconnect diverse sites with each other (Wide Area Network or WAN). From here, the idea of an open-systems model was introduced (open-computing) to provide communication over different media and facilitate integration between them.

This two-tier client/server architecture was unable to scale properly when the number of users (clients) increased enormously. The traditional client/server model had to be expanded to n-tier architecture to support such an increase in users. Logically speaking, an n-tier architecture consists of 3 major tiers residing on n (n>=1) hardware server platform(s). Hence, the database is one tier, business logic is another tier and the client tier is third, which is very thin.

A thin client could be a web-browser. The business logic could reside on the same server or on a different server, but the business logic tier will need to be replaced whenever a new version of the software is installed. The client will still be accessing the same set of applications without being forced to go into new training or amending the software part installed on the client side.

Comparing the cost of a mainframe computer to a PC-Server, the difference is quite large in all aspects: maintenance, leasing, hardware parts, site preparation/requirement and operating system, and system software. The benefit, in terms of speed relative to volume and number of processed transactions, the PC-Server will report higher performance rates.

Based on the current computer environment at JVA, MWI and in accordance with MISSC standards, the Client/Server architecture falls within the mold and standards of modern computer systems and standards.

Information Technology is a continuously changing field and newly implemented systems should comply with latest standards and architectures.

1.4 Guidelines

- According to the Management Information System Steering Committee (MISSC), Microsoft Windows 95, 98 and NT Workstation is the standard Client (Workstation) operating system. MS-Windows 95 provides the user with a Graphical User Interface, which is more user-friendly and easy to use. Hence, the required FAS software has to run on MS-Windows 95.

- All accounting and software packages are built around the Client/Server architecture. Since we are using MS-Windows 95 as our Client (Workstation) operating system, the adopted FAS software should comply with this architecture.

- For FAS to be operational it has to integrate and interface with the existing systems at JVA. The Client/Server architecture is an open-system architecture, which can integrate and be linked with other systems. Hence, the new FAS should comply with this standard.

CHAPTER 2
METHODOLOGY AND SCOPE

2.1 Introduction

As an outcome of our understanding of JVA business and related accounting cycles, the following scenario was developed to illustrate where the new FAS is going to be installed, what modules are going to be used and the data propagation path.

The following major factors affect the number and structure of scenarios that can be developed. Those factors are:

- Business Practices and Findings
- Technical Limitation
- Cost/Benefit and FAS Budget

A discussion of the these factors will be covered throughout this document, after which a description of the suggested FAS system design will be discussed.

2.2 Business Practices and Findings

Financial data is centralized at the headquarters in Amman, where water billing and collection information is maintained electronically at Dirar. This information is reported, by directorate, in the form of a monthly report to the Finance Department in Amman.

The developed scenario for setting up the new FAS is based on the following findings:

- All expenditure invoices are submitted to the Finance Directorate at headquarters for final approval and payment. Accordingly, all vendors' checks are processed and distributed through headquarters.

- The 10 stage offices of the North, Middle, and South Directorates operate the Water Management Information System (WMIS) which maintains farmer, water billing and collection information. The data is transferred through a modem or via a magnetic media to the Water Management and Control Directorate in Dirar.

- The WMIS is already installed in the two stage offices of Southern Ghors and Wadi Araba (SGWA). Currently, the water billing and collection data is maintained on manual records and will be replicated in the WMIS.

- All cash collections in the valley are reported periodically to the Finance Directorate at headquarters. This reporting is done in the form of a summary report or illustrated using bank deposit slips.

- The Deir Alla Central Store (Al Ruweiha store) maintains two types of manual records:

- Inventory records for all the stores except the SGWA , KTR and Amman stores; and
- Custody items records.

Two copies of the receiving and issuing vouchers generated by all stores except the SGWA, KTR and Amman stores are sent to Deir Alla. At Deir Alla, one copy is maintained for inventory records and the other for custody item records. These records are maintained for control purposes. SGWA, KTR and Amman stores maintain their own custody items records.

- The Workshop and Equipment Directorate in Al-Fanoush maintains information on store items and job cost information on an automated computer system accompanied by manual records.

- SGWA stores and workshop operate the same computer system used by the Workshop and Equipment Directorate in Al-Fannoush. The system was recently installed and data is being keyed to that application.

2.3 Interconnection Technical Limitation

Interconnecting Amman headquarters with different directorates and departments in the Jordan Valley limits the number of connectivity scenarios that can be developed and limited the scope to a semi-offline scenario. These limiting factors include:

- **Availability of Communication Lines.** The most feasible, convenient and tested mean of communication between the JVA's office in the Jordan Valley and the Amman headquarters is a dial-up Integrated Digital Service Network (ISDN) line. If ISDN is not available other means of communication should be recommended by the vendor(s). Currently, ISDN is available between Amman and the Jordan Rift Valley and has been tested at Water Management and Control Directorate at Dirar.

- **The Jordan Valley climate.** High temperature and humidity will render certain solution types unfeasible or possibly inoperable. The climate demands a solution that can be adapted to the high temperatures of the Valley.

In conclusion, the selected means of communication will provide the data transfer for interface with the FAS and enable the generation of all required reports.

2.4 Cost/Benefit and FAS Budget

Another baseline for our recommendation was the FAS budget and the number of PCs allocated for in that budget. Given this constraint, we have tried to maximize the current information technology resources used at JVA.

The idea of integration with those systems minimizes the amount of hardware equipment needed. For example, the WMIS replicates financial data on a regular basis to the Water Management and Control Directorate at Dirar. Hence, the need for a server, PC(s) and LAN/WAN to be established at the directorate level was eliminated.

CHAPTER 3
ACCOUNTING SOFTWARE STRUCTURE

As discussed earlier, the General Ledger (GL) module is considered to be the baseline of any financial accounting software. The GL module includes the Chart of Accounts and maintains the general financial data.

Other modules represent the sub-ledgers that handle the detailed financial information and are integrated with the GL module. Some of them can be implemented as stand alone modules, not being linked to the GL module, yet they can integrated with the GL at any given time. On the other hand other module has to have the GL in order to operate.

Based on our analysis of the current JVA business environment and accounting cycle and procedures, it was agreed upon that the following modules need to be available within any FAS software. They will be required for successful implementation of an FAS:

- General Ledger (GL) Module.

- Accounts Receivable (AR) Module. Using the AR module you can manage your customers and fine-tune customer relations by keeping track of important sales information and outstanding balances. It will maintain farmer and other receivables billing, collection and master file data.

- Accounts Payable (AP) Module. This module manages and facilitates entry of vendor invoices, flexible cash disbursement and full check reconciliation.

- Purchase Order (PO) Module. This module provides you with a comprehensive, fully integrated purchasing system. Receipts automatically update inventory and invoices for the received items, the invoices are automatically transferred to Accounts Payable.

- Inventory Control (IC) Module. Inventory Control is a complete multi-locational inventory management and accounting system that keeps track of stock levels, processes inventory receipts, shipments, returns and adjustments. The module provides screen inquiry and reporting functions that give current detailed information on quantities, prices and item movements crucial to effective inventory management.

- Fixed Assets (FA) Module. The FA module will maintain a complete history for each asset, including book depreciation and tax allowances, revaluations, locations, cost centers, etc.

- Job Costing (JC) Module. Job Costing records all job related transactions simply and easily. Job Costing will record labour applied, materials consumed, subcontractors employed, equipment used and overhead contributions. Invoices can be produced just as easily from within either Job Costing or Accounts Receivable.

- Work In Progress (WIP) Module. The WIP is essential for recording and tracking all related information on projects under construction. Such activities include dam building, irrigation systems, etc. The WIP will give the JVA staff the ability to track and record project transactions and related information within the accounting

standards (reliability, matching). The WIP module will provide JVA with a tool to capitalize all incurred specific project related expenses. Such expenses may include, but are not limited to transportation, interest, raw material, labor, wages and feasibility study.

CHAPTER 4
SUGGESTED SCENARIO

4.1 Suggested Scenario Description

The following scenario, illustrated in Figure 4.1, describes the data flow path and required modules at specified locations where data transfer and/or data entry is required. The scenario is based on the different factors affecting the system design strategy and the findings from the business process mapping.

- Phase B of the Kreditanstalt fur Weider Aufbau (KfW) project will link the ten stage offices and the three directorates with Water Management and Control Directorates (Dirar). Given this, water billing and collection information can and will be transferred to Dirar/Amman on a regular basis.

- Data at Dirar will be transferred to headquarters on a regular or demand basis to be interfaced with the Accounts Receivable (AR) module. Other cash collections will either be entered into the WMIS at the stage office level, or reported from the directorate office to Dirar where it will be entered into the FAS.

- The central stores in Deir Alla (Al-Rewiha) will maintain all stores and inventory through an Inventory Control (IC) module.

- Data at the central stores in Deir Alla (Al-Rewiha) will then be transferred to headquarters on a regular or demand basis to update the IC module in Amman.

- The Job Costing (JC) module is currently installed at the following sites: Central Workshop (Fanoush) and SGWA workshop. Financial information for cost allocation to different directorates is to be generated at the specified locations and transferred to headquarters. The financial reports generated will be used at the headquarters level for reporting on the cost centers.

- The Inventory Control (IC) module is currently installed at the following sites: Central Workshop (Fanoush) and SGWA workshop for item tracking and coding.

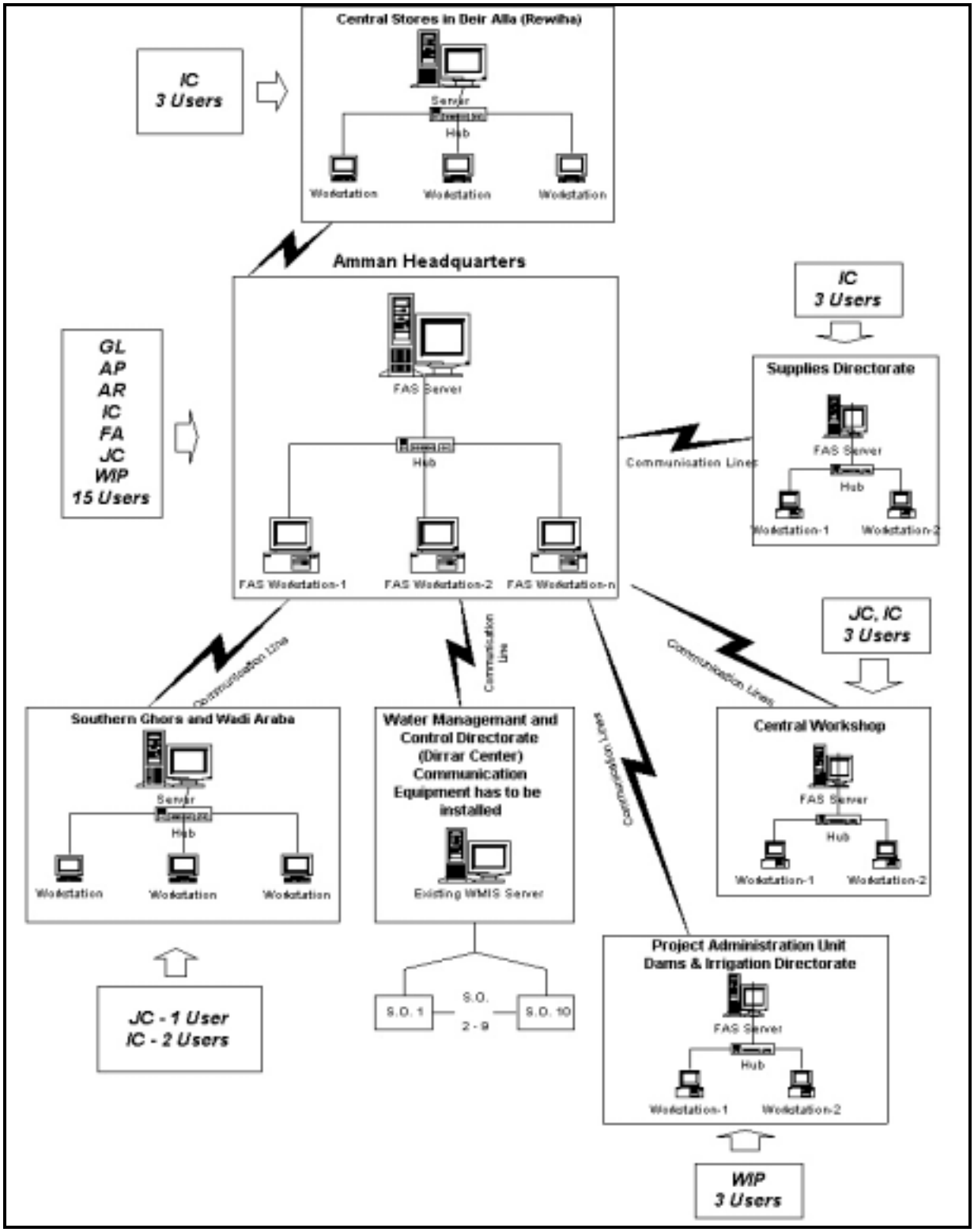
- Financial data will be centralized at the headquarters where all the software modules are to be implemented. The modules to be implemented are: General Ledger (GL), Accounts Payable (AP), Accounts Receivable (AR), Purchase Order (PO), Inventory Control (IC), Fixed Assets (FA) and Work In Progress (WIP).

- The Supplies Directorate will be linked to the data server at the headquarters to monitor the inventory data. Headquarters will supply all stores with inventory data regarding the availability of certain item(s) in stock and the location of such item(s) with item coding. Access to Accounts Payable will need to be granted to the Supplies directorate in order to track vendor related information.

- Laboratory revenue will be entered manually at headquarters in accordance with reports received from the laboratory accounting section.

- Access to Fixed Assets (FA) and Work In Progress (WIP) modules must be granted to the Dams and Irrigation Directorates and the Lands Directorate to record and maintain related information.

Figure 4.1
FAS Design Scenario



4.2 Estimated Number of FAS Users

The following table summarizes FAS estimated number of users.

Location	GL	AP	AR	IC	JC	FA	WIP	No. of Users
JVA Headquarters – Amman	X	X	X	X	X	X	X	15
Central Stores (Rewiha)				X				3
Supplies Directorate		X		X				3
Central Workshop				X	X			3
Southern Ghors and Wadi Araba				X	X			3
Dams						X	X	3
X: Module to be installed/Access to be granted				**Total**				**30**